ABSTRACT:

The hybrid optical-wireless access network (HOWAN) is a favorable architecture for next generation access network. It is an optimal combination of an optical backhaul and a wireless front-end for an efficient access network. In this paper, the HOWAN architecture is designed based on a wavelengths division multiplexing/time division multiplexing passive optical network (WDM/TDM PON) at the optical backhaul and a wireless fidelity (WiFi) technology at the wireless front-end. The HOWAN is proposed that can provide blanket coverage of broadband and flexible connection for end-users. Most of the existing works, based on performance evaluation are concerned on network layer aspects. This paper reports physical layer performance in terms of the bit error rate (BER), eye diagram, and signal-to-noise ratio (SNR) of the communication system. It accommodates 8 wavelength channels with 32 optical network unit/wireless access points (ONU/APs). It is demonstrated that downstream and upstream of 2 Gb/s can be achieved by optical backhaul for each wavelength channel along optical fiber length of 20 km and a data rate of 54 Mb/s per ONU/AP along a 50 m outdoor wireless link.